

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 20043WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/NL 03/00897	International filing date (day/month/year) 17.12.2003	Priority date (day/month/year) 17.01.2003
International Patent Classification (IPC) or both national classification and IPC F28D21/00		
Applicant DSM IP ASSETS B.V.		



- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

- This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16.08.2004	Date of completion of this report 10.05.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Van Dooren, M Telephone No. +31 70 340-4097 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/NL 03/00897**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-10 as originally filed

Claims, Numbers

1-11 as originally filed

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1,7,10
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: US-A-5 384 404 (LEE JING M) 24 January 1995 (1995-01-24)

D2: GB-A-2 182 395 (FOSTER WHEELER ENERGY LTD) 13 May 1987 (1987-05-13)

D3: US-A-5 474 280 (MARTIN CHARLES A) 12 December 1995 (1995-12-12)

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 7 and 10 does not involve an inventive step in the sense of Article 33(3) PCT.

2.1 The document D1 is regarded as being the closest prior art to the subject-matter of claims 1, 7 and 10, and discloses (*see column 3, line 55 - column 4, line 66 and the figure; the references in parentheses applying to this document*):

* Process for the extraction of energy from flue gases of a furnace (18) which is operated with a fuel (*see column 4, line 19*) and which is used in a process for the production of melamine, the process comprising a first heat exchange step in which the flue gases are heat exchanged with a first process stream. [claim 1]

* Apparatus for supplying process heat in a process for the production of melamine, comprising a salt furnace (18) which includes a heat exchange unit in which salt is heated (*see column 4, lines 11-20*). [claim 7]

* Process for optimizing an existing apparatus for the supply of process heat from flue gases in a process for the production of melamine. [claim 10]

2.2 The subject-matter of claims 1, 7 and 10 therefore differs from this known process and apparatus in that:

* the flue gases are heat exchanged with a second process stream in a second heat

exchange step. [claim 1]

* the apparatus includes at least one further heat exchange unit which directly or indirectly heats a process stream. [claim 7]

* at least one heat exchange unit is added for the direct or indirect heating of a process stream. [claim 10]

2.3 The objective problem to be solved by the present invention may therefore be regarded as achieving a higher efficiency while avoiding an increase in NO_x emission.

2.4 The solution proposed in claims 1, 7 and 10 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons :

A solution to this problem is given in D2 (*see page 1, lines 16-24; page 2, lines 38-60 and lines 125-128 and figures*), where extra heat exchange steps for the flue gases of a furnace to heat other process streams (not the fresh air used in the burner) in a process are provided, leading to an increased efficiency but not to an increased NO_x emission.

The objective problem is related to a process (a) of the extraction of energy from flue gases of a furnace. Although in this particular case, this process (a) is used in a process (b) for the production of melamine, the skilled man would look in the more general field of processes (a) of the extraction of energy from flue gases from a furnace, which are used in chemical processes in general. He would therefore know and consider D2 (and also D3 which also describes the step of heat exchange between the flue gases of a furnace and process streams in a chemical process) in order to solve the problem posed. Although D2 does not address a reduction of NO_x emissions, it is clear for the skilled man that the solution proposed in it will not lead to an increase in NO_x emissions, since there is no heat exchange between the flue gases and the fresh combustion air.

The skilled person would therefore regard it as a normal design option to include the features of providing extra heat exchange steps for the flue gases of a furnace to

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• heat other process streams (not the fresh air in the burner), in the apparatus and process described in document D1 (*eg. to heat the high pressure steam used in the reboiler 42, see column 4, lines 65-66*) in order to solve the problem posed.